REMARKS

The application has been amended and is believed to be in condition for allowance.

There are no formal matters outstanding.

Claims 16-20 are new and are based on claims 1-5. Claim 16 is more specific as to a feature of the invention discussed below.

Applicants acknowledge with appreciation that claims 2, 3, 6, 10, 11, and 14 have been indicated to be directed to allowable subject matter.

Claims 1, 4, 5, 7-9, 12, 13, and 15 stand rejected as obvious over MCNEIL et al. 6,800,452 in view of COLBETH et al. 6,424,750.

Claims 1, 9, and 16 are independent.

Claim 1 recites a method for measuring radiation from an object with a charge coupled device comprising a matrix of pixels arranged in rows and columns, wherein at least one pixel is defected. The recited method steps that the pixels whose charges are accumulated are determined on the basis of the position(s) of said at least one defected pixel.

Neither of the references makes this teaching.

MCNEIL is offered as disclosing a method for measuring radiation from an object with a charge coupled device comprising a matrix of pixels.

On page 3 of the Official Action, it is stated that MCNEIL does not explicitly disclose that the pixels whose charges are accumulated are determined on the basis of the positions of said at least one defected pixel in the sensor. This is because McNeil does not mention defective pixels at all. Accordingly, there is also no implicit teaching in this regard or even any appreciation of using defective pixels as a basis for determining which charges are accumulated.

COLBETH is offered as disclosing "binning" of pixel signals from a detector array.

Accordingly to COLBETH, the accumulated charge distribution is first read from the CCD array regardless of the fact that some of the pixels are known to be defective. A pixel-specific correction word (Figure 9) is used to post-process each pixel value, and discrimination against the invalid values that originated from defective pixels is only effected in the decode/select unit 106 (column 9, lines 40-45). Thus, the invalid pixel value gets processed from the output charge well and moved into the processing chain, and it is only late in its propagation that the invalid pixel value is blocked. This is well beyond the output charge well as recited in the claims.

COLBETH teaches that "binning" is effected even further along the processing gain. See that in Figure 8 that the averaging blocks 108 and 110, as well as the buffer/filter block 112, effect what could be called the closest equivalent to the

binning process of the present invention. Again, this is not as recited.

Thus, COLBETH does not teach that charges from at least two pixels are accumulated into the output charge well, with the pixels whose charges are accumulated being determined on the basis of the position(s) of said at least one defected pixel. Therefore, this recitation of the independent claims is not satisfied by COLBETH or MCNEIL.

The invention provides that discrimination against invalid pixel values coming from defective pixels, as well as the whole concept of binning, are effect very early in the processing chain. Most advantageously, the invalid pixel values do not propagate any further than the output charge well. See item 430 in Figure 4 and item 530 in Figure 5 of the present application. Also see the "clearing the output node" step 655 in Figure 6 and step 755 in Figure 7.

No pixel-wise correction needs to be attempted, and the invalid measurement values never actually enter the whole detection and processing apparatus. This takes care of collecting and arranging the measurement data read from the CCD array. COLBETH does not make this teaching. Thus, the invention avoids unnecessary processing operations and erroneous data is kept from entering the processing chain, which reduces the possibility of it being erroneously taken into account in the processing of valid values.

Further, according to COLBETH, knowing that there are defective pixels does not affect the size and shape of superpixels. See again column 9, lines 40-45. If the pixel value is known to be invalid because of a defective pixel, some corrective data is read from a memory, so that the corrective data replaces the originally invalid pixel value. This has no affect whatsoever on the averaging or "binning" made in blocks 108, 110 and 112. These blocks operate completely without knowing whether the measurement data includes (corrected) values from the defective pixels or not. The teaching of COLBETH is to replace defective pixel data with corrective data read from a memory and then to process the replacement data just like any other data.

Note that COLBETH does not suggest to accumulate charges of any pixels. COLBETH accumulates digital values that represent the charges that have been read out and even corrected with the correction words before any accumulating (or averaging as used in COLBETH) takes place.

Quite to the contrary, the present invention re-arranges the whole division of the pixel array into superpixels so that the new superpixels only include valid read pixel data and specifically excludes values from defective pixels. This is a consequence of invalid pixel values being discriminated against in the readout process (the defective pixel values not propagating beyond the output charge well).

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Thus, the basic approach in handling invalid pixel data is different in COLBETH and the invention as recited. Therefore, COLBETH does not teach or suggest the features of the invention and the combination of MCNEIL and COLBETH would not teach or suggest the recited features of the invention, i.e., that the pixels whose charges are accumulated are determined on the basis of the position(s) of said at least one defected pixel or the more detailed "the pixels whose charges are accumulated are determined on the basis of the position(s) of said at least one defected pixel so that defective pixel values do not propagate beyond the output charge well" of claim 16.

Reconsideration and allowance of all the independent claims are respectfully requested. The dependent claims are believed allowable at least for depending from an allowable independent claim.
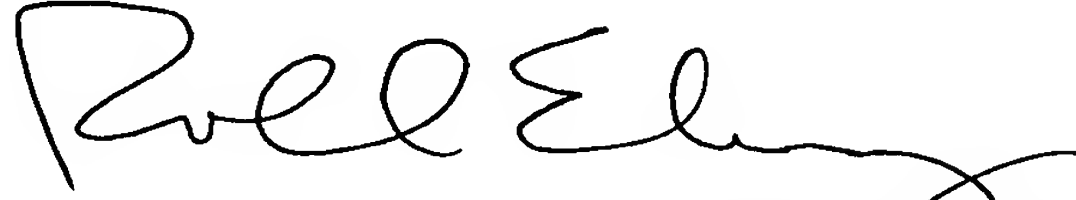
Applicants believe that the present application is in condition for allowance and an early indication of the same is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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